

DRUG DISPOSAL

EXCERPTED FROM: Vol 20 No 4

Patients often ask how to dispose of unused or expired meds.
There's no easy answer.

Flushing meds down the sink or toilet is common...but bad for the environment.

Sewage treatment plants weren't designed to remove drugs. Now treated water is showing traces of many drugs...acetaminophen, aspirin, diazepam, estrogen, gemfibrozil, verapamil, and others.

Throwing meds in the trash causes less pollution...but other people or animals might get hold of them.

There are also privacy concerns about names on vials.

Incineration is best...but not easily available.

Some household hazardous waste programs accept drugs...but many don't. They also can't accept controlled substances.

Pharmacies usually can't take back meds, either...due to strict federal and state regulations.

Experts are trying to sort this all out...and come up with some good recommendations.

Until then, if patients can't take their meds to a household hazardous waste collection site, suggest throwing them in the trash.²⁰⁰⁴¹⁵

More Details...

What's the Best Way to Dispose of Medications?

Lead author: Sherri K. Boehringer, Pharm.D., BCPS

Introduction

Getting rid of unused, unwanted, or expired medications can be a challenge. Pharmacies may send unused or expired medications back to the original manufacturer.^{1,2} Alternatively, they may employ a reverse distribution company to take care of manufacturer returns and incinerate those products that are nonreturnable.¹ But what should pharmacists be telling their patients about disposal of unwanted medications? And what should pharmacies do if patients ask them to take back previously dispensed medication?

Unfortunately, little is available in the way of formal guidelines on drug disposal – especially at the level of the final end user – the patient.¹⁻³

Once it was common practice to flush unwanted medications down the toilet. This method of disposal was preferred to throwing medications in the trash where children or illicit drug users might get ahold of them. Now, while neither method is preferable, flushing in particular may be associated with causing environmental damage.¹⁻⁵

Environmental Concerns

In prior years most of the research on the effects of chemical pollution has been focused on “priority” pollutants (e.g. pesticides) which may be harmful to the environment.^{3,4} Less attention has been directed toward pharmaceuticals that also have a potential to cause harm.^{3,4} Drugs may

More...

enter the environment inadvertently by excretion and washing or purposefully by disposal into sewage or trash.²⁻⁴

This becomes a problem because sewage treatment plants were not designed to remove pharmaceuticals and many drugs may not be completely eliminated.^{1,3-6} Pharmaceuticals have been identified in surface waters, groundwater, marine systems, and rarely, in drinking water.^{3,4,6} While the concentration of individual drugs in the aquatic system may be low, there is concern that the presence of multiple drugs with similar mechanisms of actions could lead to harmful effects through cumulative, long-term exposure.⁴ Unlike pesticide pollutants, where contact with the environment is usually sporadic, drug exposure tends to be more chronic.⁴

Drugs identified in environmental samples range from acetaminophen to verapamil.⁴ Although, the long-term effects are unknown, some drugs have been shown to have effects on aquatic life. For instance, 17 α -ethinyl estradiol is suspected of causing estrogenic effects in fish.⁴ Antibiotics are a particular concern. The increase in bacterial resistance to multiple antibiotics has been attributed to the widespread and sometimes irrational use of antibiotics as well as their increased release into the environment.^{3,4} Dietary supplements (e.g., Kava) also have the potential to cause environmental harm.⁴

How are Consumers Getting Rid of Drugs?

A survey by Kuspis and Krenzelok studied expired medication drug disposal habits in 100 pharmacies and of 500 patients.⁷ Of the pharmacies surveyed, 97% had policies in place regarding disposal of expired undispensed medication, which in most cases was returning the medication to the manufacturer. However, only 5% of pharmacies surveyed had consistent recommendations for patients on drug disposal. Approximately 25% of the pharmacies indicated that the issue of drug disposal was addressed only at the customer's request. Of the 500 patients surveyed, 1.4% returned medications to a pharmacy, 54% disposed of medications in the trash, 35.4% flushed drugs down the toilet or sink, 7.2% did not dispose of medications, and 2% stated they used all medication prior to expiration.⁷

Drug Disposal at a National Level

In the U.S. there are two types of medications where regulation is in place for drug disposal. The first is controlled substances, where disposal by pharmacies is carefully regulated by the U.S. Drug Enforcement Agency (DEA).^{2,8} If a reverse distributor is utilized to dispose of drugs, they must be registered with the DEA to accept controlled substances.⁹ The DEA does not have specific guidelines regulating disposal at the level of the end user or patient.⁹ For more information on guidelines regarding disposal of controlled substances, contact your regional DEA office, or information can be obtained at the DEA Office of Diversion Control 1-800-882-9539, or their website www.deadiversion.usdoj.gov.⁸

The second group of medications or chemicals where disposal regulations are in place is with those that are considered hazardous (e.g., nicotine, warfarin, reserpine) under the Resource Conservation and Recovery Act.^{2,10} Pharmacies and reverse distributors are required to follow specific guidelines regarding the destruction of drugs that are deemed hazardous waste.² However, these guidelines do not apply to the actions of consumers.² A complete list of medications and chemicals that are considered hazardous is available as part of the U.S. Code of Federal Regulations website at: <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?type=simple;c=ecfr;cc=ecfr;sid=775259a79f73199440389a335819bf05;idno=40;region=DIV1;q1=discarded%20commercial%20chemical%20products;rgn=div8;view=text;node=40:23.0.1.1.2.4.1.4>.¹¹ More information on the Resource Conservation and Recovery Act is available at: <http://www.epa.gov/region5/defs/html/rcra.htm>.¹⁰

There are no specific government guidelines for the disposal of drugs by the consumer. The American Pharmaceutical Association (APhA) addressed the issue of drug disposal in the Pharmacist Practice Activity Classification.¹² This document recommends that pharmacists "educate groups about the proper disposal of medications and devices [and] provide a general medication and device disposal service pursuant to state and federal law and regulations."¹² However, specifics on how to ensure proper disposal are not provided.

The U.S. Food and Drug Administration (FDA) and the U.S. Environmental Protection Agency (EPA) regulate disposal of pharmaceuticals, but primarily at the level of the

More...

manufacturer.⁴ However, a publication by Christian Daughton, Chief of the Environmental Chemistry Branch of the U.S. EPA in Las Vegas, Nevada does provide recommendations for consumers.² Dr. Daughton states that the least desirable method of drug disposal is via sewage systems.² One better alternative is returning unwanted medications to a local household hazardous waste program, some of which are now accepting consumer pharmaceuticals.² However, not all accept controlled substances. Another option is returning drugs to local pharmacies to either be disposed of by medical incineration or returned to reverse distributors.² Unfortunately, some states don't allow pharmacies to take back medications.^{1,2} Also, legality issues may surface if the returned drug is a controlled substance.¹³ This is largely because it is not legal to transfer a controlled substance originally prescribed to a patient to any other entity, including a pharmacy.¹³ A last resort is disposal in household trash destined for an engineered landfill.² Although this practice is not desirable, it is probably less environmentally hazardous than disposal into the sewage system.² More information and publications about the U.S. EPA and "Green Pharmacy" is available at www.epa.gov or <http://www.epa.gov/nerlesd1/chemistry/pharma/index.htm>.¹⁴

Drug Disposal at a State or Local Level

Generally, each state and some local agencies have drug disposal rules. However, these guidelines are sometimes misguided and recommend flushing unwanted drugs.¹ Some states and counties have more specific "environmentally friendly" guidelines. The California Waste Prevention Information Exchange provides information regarding disposal of medical waste at home including pharmaceuticals.⁵ They recommend returning drugs to pharmacies via take-back programs, but these are not present in all communities. An alternative option recommended is securing the drugs in "durable packaging" and placing in the trash.⁵

In Maine, a state mail-back program has been proposed by the state legislature to deal with unused medications.¹⁵ Patients will be provided with prepaid mailers which will be sent to a secure address where only officers of the Maine

DEA will handle the unwanted medications prior to disposal.¹⁵

In Alachua County, Florida, the Environmental Protection Department began a pilot program in January to collect and properly dispose of expired or unwanted medications.⁶ Alachua County residents may drop-off old medications at no charge at many local pharmacies and clinics. Each location has a special disposal drum where tablets and capsules are dumped into (without the pill containers). The drugs are then mixed with a solution that renders them unrecoverable prior to being appropriately disposed.⁶

Commentary/Recommendations

In today's medical world new medications are being manufactured constantly. And with this increased production comes increased usage, especially by the elderly.² Environmentalists are concerned about the effects of all these medicines on the environment.^{2,4} Regardless of how medications make their way into the environment, inadvertently by excretion or purposefully by disposal into sewage, increased usage means increased environmental levels. At this point, the long-term effects of pharmaceuticals in the environment is unknown, but there is a potential for harm.^{2,3} Methods to reduce or improve drug disposal are necessary to avoid possible environmental damage.

One suggestion for reducing drug waste is the use of "trial prescriptions."² If initial prescriptions were written for smaller amounts, less drug would go unused if the medication was found to be unsuitable for the patient. Subsequent prescriptions could be in the larger quantities typically preferred by patients and insurance companies. The return and reuse of unused medications is also a possibility, at least in long-term care facilities. The American Society of Consultant Pharmacists have set up criteria for the reuse and return of medications to the dispensing pharmacy.¹⁶ Federal and state laws and regulations must still be followed and only noncontrolled substances can be returned if dispensed in tamper-evident packaging with packaging still intact at time of return.¹⁶

The best way to dispose of medications once they are dispensed can be tricky. Unfortunately, uniform guidelines are not available to best direct consumers how to dispose of medications. Flushing medications down the toilet is no longer

More...

recommended because of potential for environmental damage.¹⁻⁶

At this time, probably the best option is to direct patients to a local household hazardous waste facility, some of which are now accepting unwanted medications from patients for incineration. However, some programs may refuse to take back controlled substances because of legality issues (similar to that of pharmacies).¹³

Pharmacy take-back programs are a great idea. However, they are not widely available and they are difficult to set-up. If a pharmacy were to initiate a take-back program, the DEA (and possibly local law enforcement) would likely need to be involved to oversee the transfer of controlled substances.¹³ Likewise, hazardous pharmaceuticals that are returned to pharmacies must be disposed of following regulations under the Resource Conservation and Recovery Act.^{10,13} Unless a pharmacy has developed a take-back program which has addressed these issues, it is not a good idea to take back medications – especially controlled substances and hazardous medications.

A last option is throwing drugs in the trash. This is by no means preferable but is likely less harmful to the environment than disposal via sewage.² If drugs are to be disposed of in the garbage there are a few things that should be considered. The first is children, pets, and wildlife. All of which harm could come to if they were to consume these drugs. The second is drug abusers. The third is privacy concerns if vials are thrown away with patient names on them. There are some steps that can be taken to lessen the potential for abuse and privacy issues and improve safety.¹

- 1) Drugs should be kept in the original container with the childproof lids attached
- 2) If patient's names are present they should be obliterated.
- 3) Special care should be taken with liquids, especially if they are in glass bottles because of potential for breakage. It is a good idea to place liquids in a plastic sealable bag so if there is leakage it will be contained.
- 4) Try and make the drugs as unpalatable as possible. Add a nontoxic unpalatable spice such as cayenne pepper or some water and kitty litter.
- 5) The drugs should then be placed in durable packaging that does not indicate the contents such as a brown paper box.

- 6) Place in the trash as close to garbage pick up time as possible.

Before making any specific recommendations to patients, it is a good idea to find out your state or regional drug disposal rules by checking with your state board of pharmacy and local U.S. EPA office.

More. . .

Users of this document are cautioned to use their own professional judgment and consult any other necessary or appropriate sources prior to making clinical judgments based on the content of this document. Our editors have researched the information with input from experts, government agencies, and national organizations. Information and Internet links in this article were current as of the date of publication.

References

1. Anonymous. Responsible drug disposal. *Consultant Pharmacist* 2003;18:788-90,99.
2. Daughton CG. Cradle-to-cradle stewardship of drugs for minimizing their environmental disposition while promoting human health. II. Drug disposal, waste reduction, and future directions. *Environ Health Perspect* 2003;111:775-85. Also available at: <http://www.epa.gov/esd/chemistry/pharma/image/s/green2.pdf>. (Accessed March 19, 2004).
3. Jones OAH, Voulvoulis N, Lester JN. Potential impact of pharmaceuticals on environmental health. *Bull World Health Organ* 2003;81:768-9.
4. Daughton CG, Ternes TA. Pharmaceuticals and personal care products in the environment: agents of subtle change? *Environ Health Perspect* 1999;107(suppl 6):907-38.
5. Waste Prevention Information Exchange: Health Care Waste. Medical Waste at Home. Available at: <http://www.ciwmb.ca.gov/WPIE/HealthCare/PPCP.htm>. (Accessed March 19, 2004).
6. Alachua County Environmental Protection Department. County to collect old medicines for disposal (December 2003). Available at: http://environment.alachua-county.org/view_story.asp?ID=1099. (Accessed March 13, 2004).
7. Kuspis DA, Krenzelok EP. What happens to expired medications? A survey of community medicine disposal (abstract). *Vet Hum Toxicol* 1996;38:48-9.
8. U.S. Drug Enforcement Agency. Diversion control program. Available at: <http://www.deadiversion.usdoj.gov>. (Accessed March 18, 2004).
9. Personal Communication. U.S. Drug Enforcement Agency. Diversion Control Program – Boston Field Division. Boston, MA 02203. March 22, 2004.
10. U.S. Environmental Protection Agency. Resource Conservation and Recovery Act 42 U.S.C. s/s 6901 et seq. (1976). Available at: <http://www.epa.gov/region5/defs/html/rcra.htm>. (Accessed March 18, 2004).
11. US Code of Federal Regulations. Title 40: Protection of environment, Part 261-Identification and listing of hazardous waste (March 18, 2004). Available at: <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?type=simple;c=ecfr;cc=ecfr;sid=775259a79f73199440389a335819bf05;idno=40;region=DIV1;q1=discarded%20commercial%20chemical%20products;rgn=div8;view=text;node=40:23.0.1.1.2.4.1.4>. (Accessed March, 18 2004).
12. American Pharmaceutical Association. Pharmacist Practice Activity Classification (1998). Available at: <http://www.aphanet.org/lead/practiceclass.html>. (Accessed March 18, 2004).
13. Personal Communication: Dr. Christian Daughton, PhD. Chief, Environmental Chemistry Branch. Environmental Sciences Division. National Exposure Research Laboratory. U.S. EPA. Las Vegas, NV 89119. March 22, 2004.
14. U.S. Environmental Protection Agency. Pharmaceuticals and Personal Care Products (PPCPs) as environmental pollutants. Available at: <http://www.epa.gov/nerlesd1/chemistry/pharma/idx.htm>. (Accessed March 22, 2004).
15. State of Maine Legislature. LD1826. An act to encourage the proper disposal of expired medications (January 18, 2004). Available at: <http://janus.state.me.us/legis/LawMakerWeb/summary.asp?ID=280012218>. (Accessed March 22, 2004).
16. American Society of Consultant Pharmacists. Statement on the return and reuse of medications in long-term care facilities (2003). Available at: <http://www.ascp.com/public/pr/policy/return.shtml>. (Accessed March 21, 2004).



The most practical knowledge in the least time...



3120 West March Lane, P.O. Box 8190, Stockton, CA 95208 ~ TEL (209) 472-2240 ~ FAX (209) 472-2249
Copyright © 2004 by Therapeutic Research Center – Posted with permission by EPA

Subscribers to *Pharmacist's Letter* and *Prescriber's Letter* can get *Detail-Documents*, like this one, on any topic covered in any issue by going to www.pharmacistsletter.com or www.prescribersletter.com